Utilities Regulatory Authority

Electricity Fact Sheet

2013 – 2018

October 2019

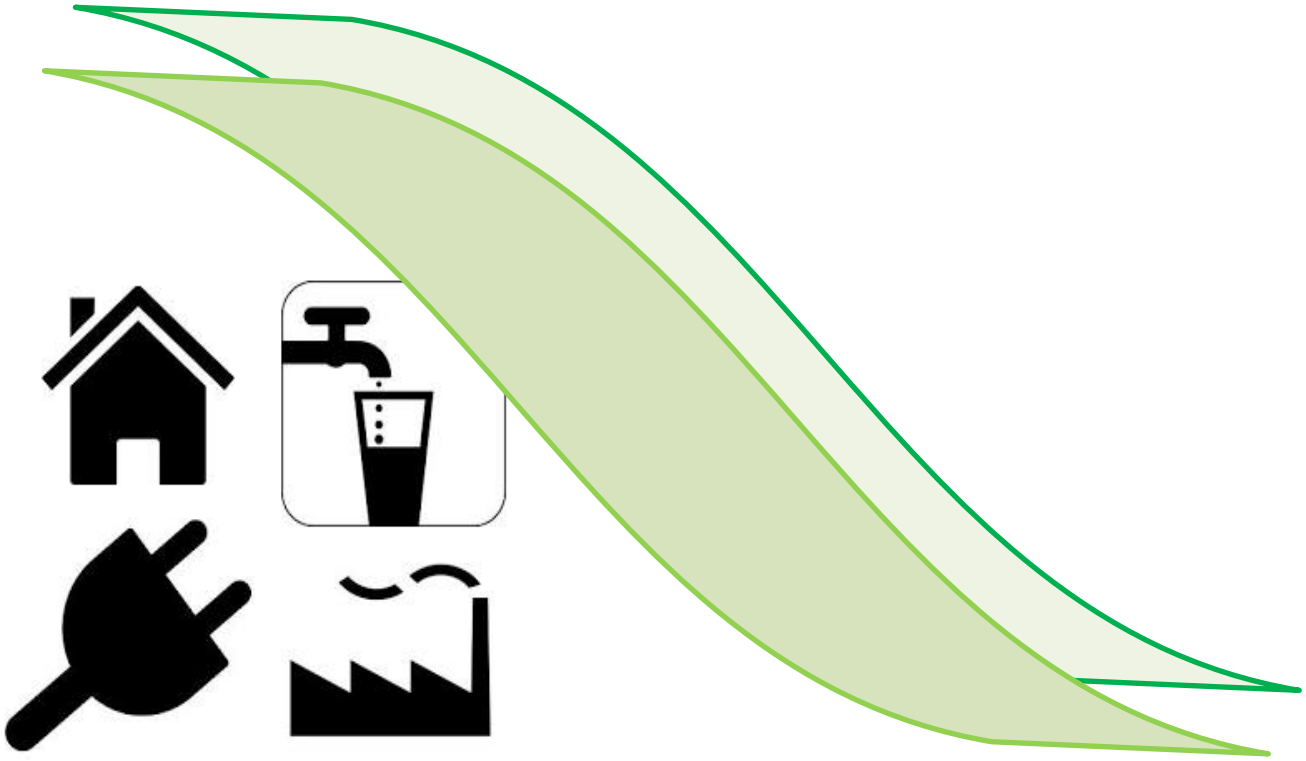


Table of Contents

Table of Figures

Utilities Regulatory Authority of Vanuatu
Investment Building, NPF Compound
PMB 9093
Port Vila, Vanuatu

1 Introduction

The Utilities Regulatory Authority (the 'Authority') is the economic regulator for electricity and water services in Vanuatu. It was established under the URA Act no.11 of 2007 (as amended). The Authority is pleased to present this updated 'Electricity Fact Sheet' (EFS) providing electricity statistical information/data via charts and graphs in Vanuatu particularly within the four concession areas of Port Vila, Luganville[1], Malekula (Lakatoro) and Tanna (Lenakel) in which the two main utilities, UNELCO[2] and VUI[3] are operating. The EFS is provided as part of the Authority's functions under Section 12(1)(c) of the Authority's Act and does not embrace information/data on areas outside the concession areas that also generate and use electricity.

Data presented is consolidated for all concession areas. For specific details for any elements of the electricity market presented in this EFS corresponding to a particular concession area, you can always refer to the appendixes at the end of the EFS. The EFS is an update to the previous EFS issued in December of 2018. It is worth mentioning that VUI signed a Concession Agreement with the Government in June 2019 granting it the right to operate the Concessions of Luganville and Port Olry now as a Concessionaire. Other concession areas which are included in the Concession Deed but are impending includes the bio-fuel sites in Sola and Mosina in Vanua Lava, the Talise Hydro in Maewo and the three bio-fuel sites in Ambae. Other Concession areas may be granted to VUI subsequently by the Government at its discretion. For new concession areas granted to a utility, subsequent updates of the EFS will reflect those new areas accordingly.

The EFS is updated on annual basis with the recent year's data (2018) added to show the six most recent years' electricity statistics meaningfully to interested readers the trend and developments within the electricity concession areas.

2 Executive Summary

Overall, the electricity developments in the Concession areas are affected by the following changes in 2018 from previous year (2017):

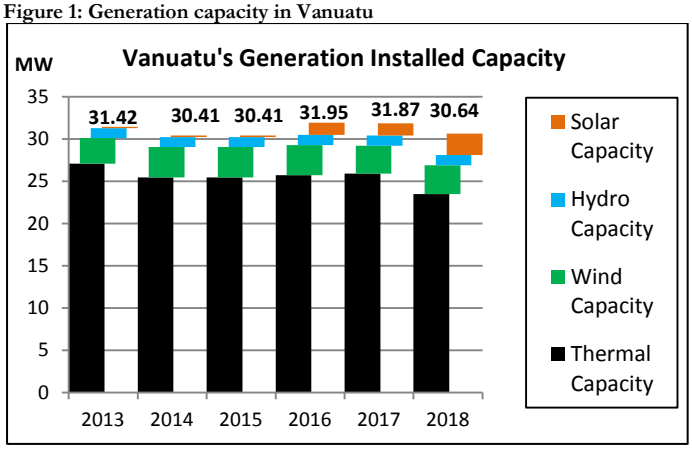
- Available electricity generation sources in Vanuatu is comprised of diesel, copra oil, hydro, wind and solar in 2018;
- Overall generation installed capacity decreased by -1.23 MW in 2018, a -3.9% reduction;
- Consolidated peak demand increased by 6.9% in 2018, a considerable increase observed compare to the 5 past years;
- Gross electricity generation increased by 0.99 GWh in 2018, a 1.3% increase from preceding year;
- The renewable penetration escalate by 13.7% given the additional Kawene Solar capacity;
- The overall diesel consumption declined slightly by 77,000 litres in 2018 while copra oil litres consumed in generation was 218,000 litres as compared to no coconut fuel utilized in 2017;
- The quantity of electricity users continue to consistently increase with approx. 980 new additional customers in 2018 throughout all the concession areas;
- The electricity network length increased in all concession areas showing commitment from respective utilities to continue extending grid services to unserved areas. Overall LV and HV network lines increased by 7.1% and 3.3% respectively; and
- The number of planned outages in 2018 remained consistent as previous year's while unplanned outages increased by 23% from previous year's.

It is believed that the EFS will communicate to interested readers useful information about the electricity market within the electricity concession areas of Vanuatu.

3 Generation installed capacity in Vanuatu

Figure 1 below shows the total installed capacity of the available generation resources in Vanuatu. Refer to Appendix 13.1 for details of each concession areas.

Figure 1: Generation capacity in Vanuatu



Source: UNELCO & VUI Regulatory Reports

The overall generation capacity recorded consecutive decrease in 2017 by 0.18 MW and further in 2018 by 1.23 MW. Details of change by type of generation source saw stagnant hydro capacity, increase in solar capacity reflecting the additional 1 MW Kawene Solar farm at Devil's point in Port Vila and an addition of 0.10 MW in the wind capacity. Thermal generation capacity has decreased in 2018 by 2.42 MW (addition in Luganville of 150 MW with decline in Port Vila by 2.79 MW).

As aforementioned, VUI was awarded the Luganville Concession Deed in which the Deed obligated the utility (VUI) to also operate smaller concession areas outside of Luganville but within Vanuatu. The statistics regarding these new concession areas are not reflected in the current EFS. Once VUI commenced

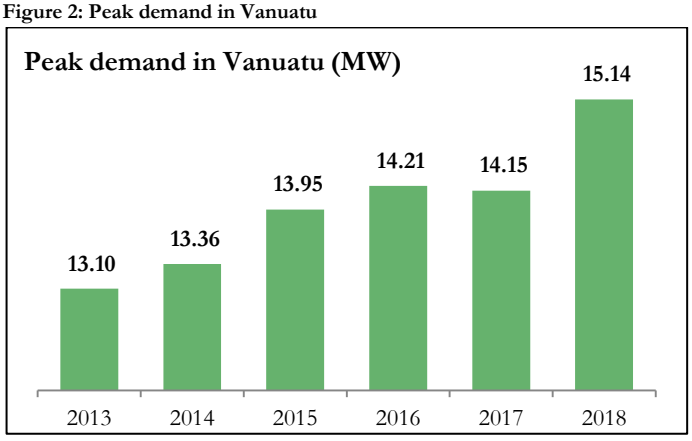
[1] Inclusive of Port Olry operations commencing 2016
[2] Union Electrique du Vanuatu Limited (operating in Port Vila (1986), Malekula (2000) & Tanna (2000))
[3] Vanuatu Utilities and Infrastructure Limited (operating in Santo, Luganville (2011))

Utilities Regulatory Authority of Vanuatu
Investment Building, NPF Compound
PMB 9093
Port Vila, Vanuatu

operating these concessions, the corresponding facts and data will be captured in the EFS accordingly.

4 Peak demand in Vanuatu

Figure 2: Peak demand in Vanuatu

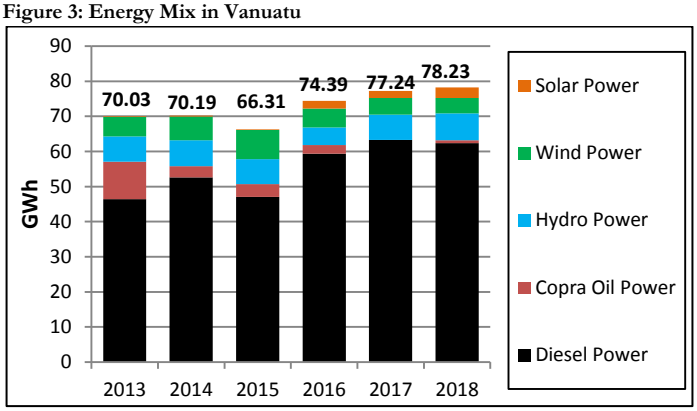


Source: UNELCO & VUI Regulatory Reports

Overall peak demand in Vanuatu has recorded the biggest increase ever in 2018 increasing by 7% from 2017. The significant change was due to Luganville's peak demand recording a significant increase of 11.6%. For peak demand reported by concession area, refer to Appendix 13.2 for corresponding years at the back of the EFS.

5 Energy mix in Vanuatu

Figure 3: Energy Mix in Vanuatu



Source: UNELCO & VUI Regulatory Reports

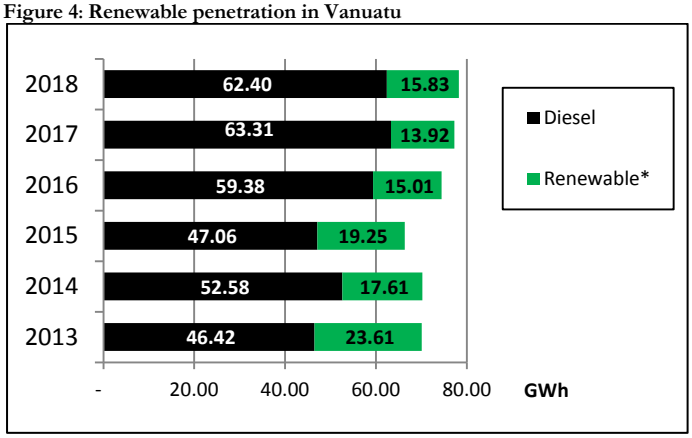
The above graph is showing the consolidated energy mix in Vanuatu throughout all concession areas. Energy from thermal source continued to dominate the share of the energy mix in 2018 by 79.8%, followed by hydro contributions of 9.7% while wind contributed 5.6%, Solar of 3.9% and Copra Oil by 1.0%. The solar contributions are inclusive of the Government Solar Farms.

In terms of energy mix evolution from 2017 to 2018, solar production increased by 51% reflecting the additional capacity in 2018 and followed by hydro output by 7%. Wind and diesel generation both decreased by 8% and 1% respectively. Copra was not utilized in generation during 2017 but was consumed for energy production in 2018 with a total output of 794 MWh.

You can refer to Appendix 13.3 which provides total gross energy generated by concession area in kWh and Appendix 13.4 detailing the energy mix provided by concession area.

6 Renewable penetration in Vanuatu

Figure 4: Renewable penetration in Vanuatu



** Renewable is inclusive of electricity from Copra oil, Solar, Wind & Hydro*
Source: UNELCO and VUI Annual Technical Reports

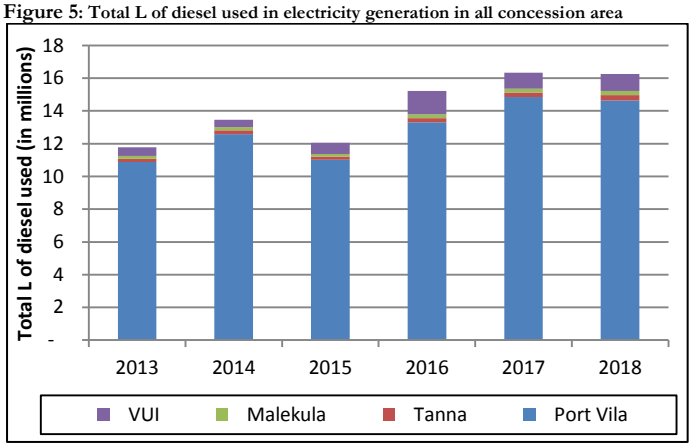
Renewable penetration increased by 13.67% in 2018 from 2017 renewable contributions. The increase stems from the inclusion of the Kawene Solar farm and usage of copra-oil in 2018 as oppose to 2017.

7 Litres (L) of diesel and copra oil used in electricity production

Figure 5 below shows the total Litres (l) of diesel utilized in all concession areas for electricity production. Overall, the total litres of diesel consumed in generation decreased by 0.5% in Vanuatu during 2018.

By concession area, litres consumed in Port Vila concession decreased by 12% while the other three concessions reported increase as follows, Luganville by 7.3%, Malekula by 10.2% and Tanna by 12.7%. The decrease in Port Vila came as a result of generation from the Kawene Solar farm supporting the reduction. The scenario might change in 2019 if renewable(s) capacity may remain idle while demand increases.

Figure 5: Total L of diesel used in electricity generation in all concession area



Source: UNELCO monthly tariff submission and Luganville concession reports

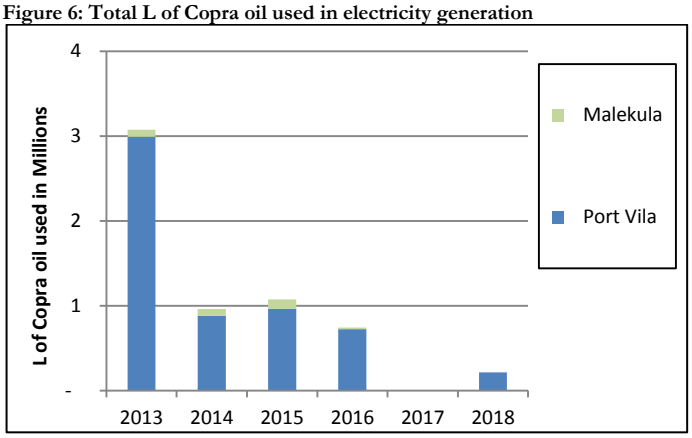
Appendix 13.5 provides in detail litres of diesel consumed by each concession area.

Figure 6 below conveys the total litres of copra oil used annually in the corresponding years. Copra oil is limitedly used

Utilities Regulatory Authority of Vanuatu
Investment Building, NPF Compound
PMB 9093
Port Vila, Vanuatu

for electricity production in the concessions of Port Vila and Malekula.

Figure 6: Total L of Copra oil used in electricity generation



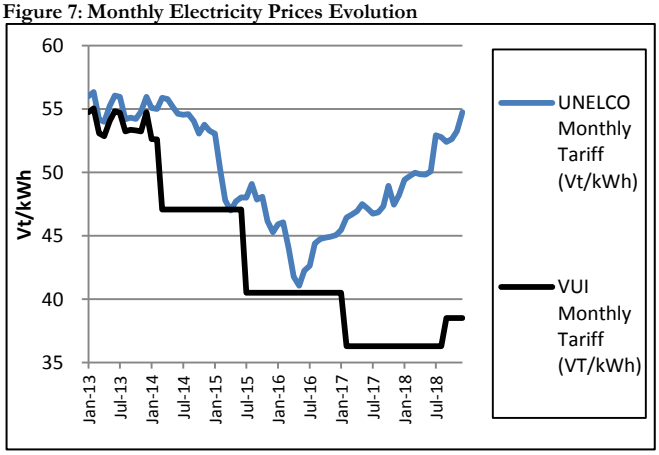
Source: UNELCO monthly tariff submission

Copra oil is not efficient as diesel which in layman terms means one litre of copra oil cannot produce similar outcome as one litre of diesel but less. That said there are cases whereby the diesel cost extremely exceeds the copra cost which result copra oil becoming cost-effective to use over diesel. This is exactly what occurred in 2013 causing the considerable use of copra oil. It can be noted that in 2017, no litres of copra was consumed in neither Port Vila nor Malekula. However in 2018, copra oil usage was observed in Port Vila only but immaterial, which means it did not affect electricity prices much. Appendix 13.6 presents the liters of copra oil used.

In the UNELCO concessions, the quantity of diesel and copra oil in litres utilized for electricity generation is used to compute the monthly electricity prices. This is due to the fact that litre of fuel used in generation is highly in correlation with electricity demand given the significant reliance on fossil fuel for baseload generation. The litre of fuel utilized in computing the initial electricity price apparently changes depending on actual demand thus the need to adjust price accordingly.

8 Electricity Prices

Figure 7: Monthly Electricity Prices Evolution



Source: UNELCO monthly tariff submission and Luganville concession reports

Electricity in Vanuatu continues to remain one of the costly services attributing to the high cost of importing diesel fuel into the country coupled with Government taxes and the great reliance on diesel for electricity generation. You can access the recent Electricity Comparison Report[4] annually issued by the Authority which captures the electricity prices around the pacific region and compare with Vanuatu's.

Electricity prices charged in the UNELCO concessions are adjusted monthly to transfer the changes in diesel cost and other major cost drivers – material cost, labour cost etc – to the consumers, such costs which are beyond the utility's influence and are controlled by the market forces. In the Luganville Concession given the requirements for diesel generation is lower, electricity tariffs are revised on an annual basis to cater for changes in the major cost drivers (specifically diesel cost).

At the time this EFS is being published, the tariff in Luganville is 38.52 Vatu per kWh – an increase by 6.14% from the previous effective tariff. It is worth mentioning also that UNELCO's tariff as determined by the Authority is being disputed before an arbitration panel and UNELCO's electricity customers will be informed of the Arbitration Award once made.

9 Electricity users and use in Vanuatu

Table 1 below provides the categorization of electricity users allocated to major user classifications in order to convey the number of electricity users and their respective consumptions.

Table 1: User Classifications Details

User Classification	Details
Industrial	Private High Voltage Users, Government High Voltage Users, Port Vila Water Usage
Commercial	Business Users
Non-Commercial	Small Domestic Customers, Prepaid Users, Other Low Voltage Users, Government Low Voltage
Others	Street Lights/Sports Field, Energy not invoice (utility's office usage, employee usage and installations)

Subsections 9.1 and 9.2 will present data per user classifications as defined in Table 1 above. Note that number of utility employees is now captured including the connections for water usage as well in Port Vila.

You can refer to appendixes 13.7 and 13.8 detailing the user count by classifications as in Table 1 reported by concession areas including the user energy consumption as well.

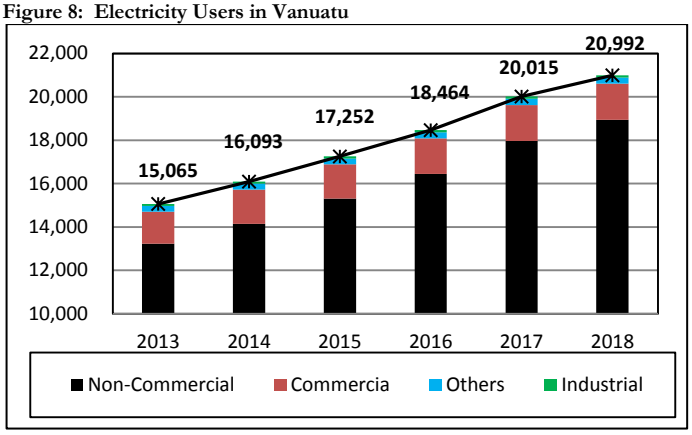
9.1 Electricity users in Vanuatu

Figure 8 below presents the trend in user numbers throughout the reporting years with 2018 as the latest year added. The user numbers are reported as at 31st December of the respective years. The user numbers correspond to electricity meters installed to provide electricity access to users.

[4] http://www.ura.gov.vu/attachments/article/52/Electricity%20Price%20Comparison%20Report%20-%20Pacific%20Area%20February%202019%20(Updated%20Version).pdf

Utilities Regulatory Authority of Vanuatu
Investment Building, NPF Compound
PMB 9093
Port Vila, Vanuatu

Figure 8: Electricity Users in Vanuatu



Source: UNELCO and VUI Annual Technical Reports

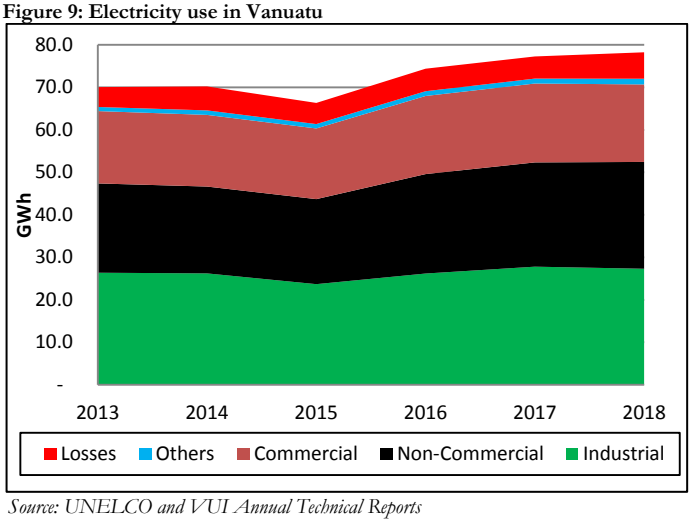
Electricity users in Vanuatu continue to grow consistently and notably, particularly for the non-commercial users which comprises significantly of residential and household users. The number of non-commercial users increased by 5% in 2018 from 2017 followed by industrial users by 2%, commercial users by 1% and others recorded a slight reduction of 2%. The most notable change in customer number is observed in non-commercial users (residential customers) with approximately 1,000 new additional customers throughout the concession areas. Immaterial additions were observed for the other electricity users.

The Global Partnership on Output-Based Aid (GPOBA) financed by the World Bank, launched and implemented in 2014 was a subsidy avenue aimed at reducing customer connection cost to promote electricity access to small domestic/residential users which contributed immensely to the additional non-commercial users as notable in 2018. This subsidy fund ceased at the end of 2018.

9.2 Electricity usage in Vanuatu

Figure 9 shows the growth in electricity usage by major user classification. In 2018, other and non-commercial users show increase in their electricity consumption from 2017 by 15.6% and 2.4% respectively. Industrial and commercial showed reduction in their consumptions by 1.8% and 1.7% respectively.

Figure 9: Electricity use in Vanuatu



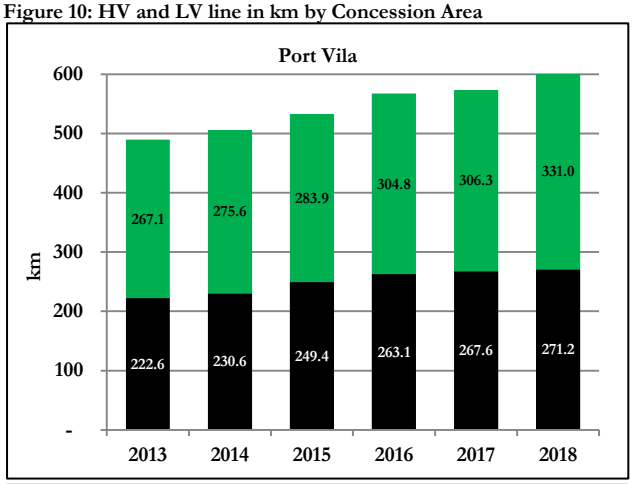
Source: UNELCO and VUI Annual Technical Reports

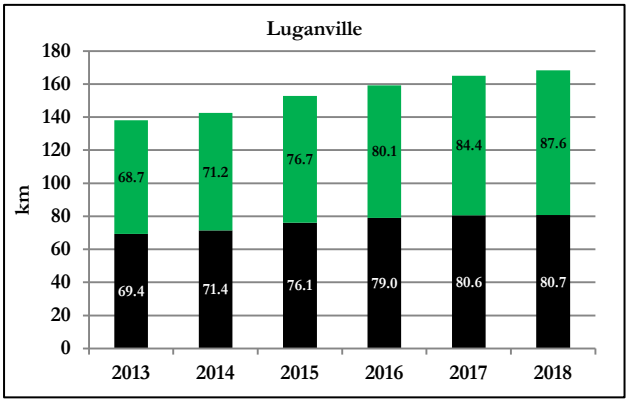
Losses depicted in figure 9 are narrowed to only represent power losses in generation plant auxiliaries', transmission and distribution losses. In the first issue of the EFS published in October of 2017, losses were inclusive of electricity consumed by utilities' employees, office usage, installations and water consumption for Port Vila. For subsequent EFS issues thereafter including this current one, losses are represented as mentioned above.

10 Electricity network length by concession area

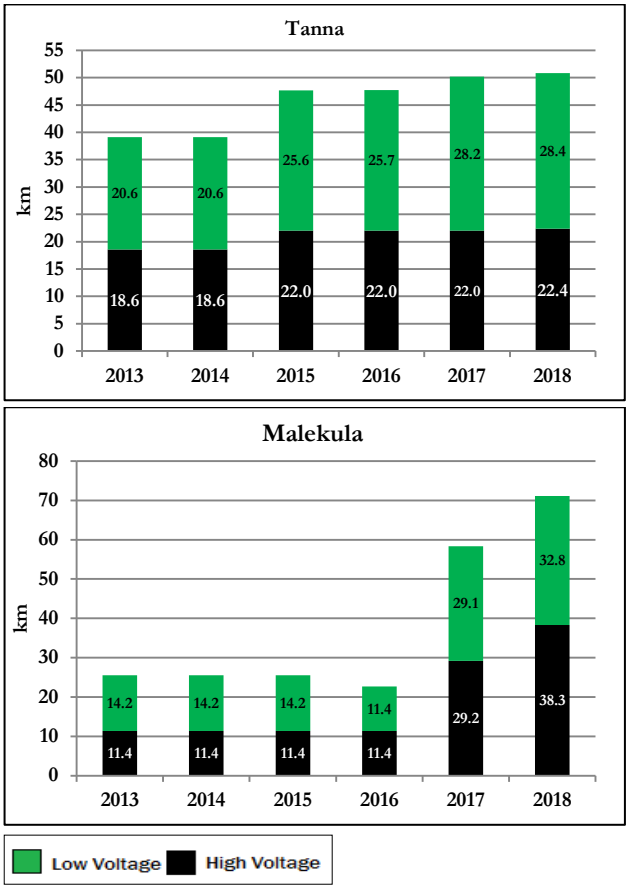
Figure 10 below represents the length of Low Voltage (LV) and High Voltage (HV) electricity lines in the four concession areas. It should be considered that the sum of the lengths of the HV and LV lines should not be considered as the total distance covered by the electricity network on ground as there are some parts of the network whereby the LV and HV lines run in parallel on the same poles. The network length presented covers both the overhead and underground lines.

Figure 10: HV and LV line in km by Concession Area





Utilities Regulatory Authority of Vanuatu
Investment Building, NPF Compound
PMB 9093
Port Vila, Vanuatu



Source: UNELCO and VUI Technical Reports

The HV lines are used to connect/link generation sources and for transmission of electricity from the generating sources to the distribution transformers. LV lines run from the transformers to the customers' respective meters. (HV lines are set at 5.5KV, 20KV and 33kV while LV lines distribute electricity rated at 230 V single phase and 380 V, three phase).

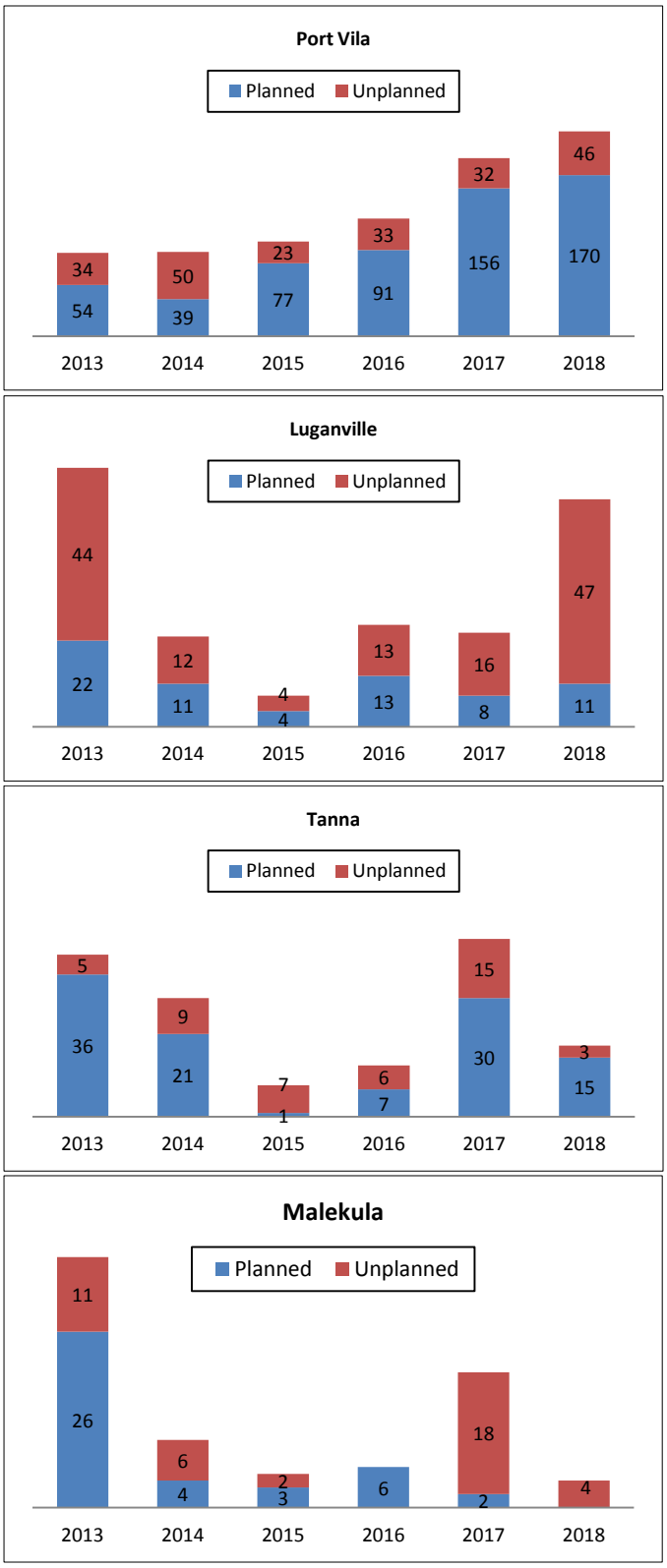
All concession areas recorded additions into their respective network lengths in 2018. Major network extensions undertaken by the two utilities in 2018 are briefly provided below:

- In Malekula, both the HV and LV network length increased in 2018 by 31% and 13% respectively. The increase in network length in Malekula was the significant when compared to the other concession areas. In Efate, additional electricity network length added was quite immaterial in 2018, with 1% increase in HV line and 8% in LV line from 2017.
- In Luganville Santo likewise the increase in network length via extensions was also insignificant with 0.1% increase in HV line and 3.8% in LV from network length in 2017. VUI was awarded the Luganville Concession Deed in June 2019 thus has been granted the right going forward to invest in Luganville.
- The least development in electricity network length is notable for Tanna with additions to the LV and HV network by 0.2 km and 0.40 km respectively.

11 Reliability and outages of electric system by concession areas

11.1 Number of Outages (Planned and Unplanned) by concession areas

Figure 11: Frequency of outages by concession areas



Source: UNELCO and VUI Technical Reports

Figure 11 is showing simply the number/frequency of outages in the concession areas with 2018 data added. Planned outages are outages planned by utility, purposely to allow utility in conducting maintenance works, network upgrades and to connect extensions to the electricity network. The time and period of time electricity service is unavailable to customers is usually communicated beforehand to customers via various communication means (e.g. radio, newspaper etc) for customers' awareness and preparation towards such time.

Unplanned outages are interruptions of electricity supply to customers that are caused by technical faults, vandalism by citizens and force majeure acts to the electricity network. It is notable that unplanned outages in 2018 are more prominent in Luganville followed by Port Vila. In Luganville, this has become a very common problem to which the utility is attempting to indentify practical solutions which can assist in reducing unplanned outages to all the Luganville customers.

11.2 Reliability of system by concession area

The below abbreviations are useful in interpreting Table 2 hereafter regarding the average number of times (frequency) and duration of planned and unplanned outages a customer experiences annually throughout the various concession areas. Higher values indicate that a customer encounters more interruption in electricity services

N/A – Not Available
SAIFI – (System Average Interruption Frequency Index) is a measure of the number of times the average utility customer experiences an outage
SAIDI – (System Average Interruption Duration Index) is the average outage duration for each customer served reported in minutes.

Table 2: SAIFI and SAIDI by Concession Area

Years	Planned/ Unplanned/All	Port Vila		Lugaville		Tanna		Malekula	
		SAIFI	SAIDI	SAIFI	SAIDI	SAIFI	SAIDI	SAIFI	SAIDI
2013	Planned	1.0	109.0	1.2	326.8	6.5	243.2	3.1	275.7
	Unplanned	5.6	127.4	11.4	154.1	2.6	610.3	10.0	529.0
	All	**6.6**	**236.4**	**12.6**	**480.9**	**9.1**	**853.5**	**13.1**	**804.7**
2014	Planned	0.3	35.8	1.4	325.1	3.1	422.9	0.7	45.0
	Unplanned	10.8	241.5	12.0	40.0	7.2	115.0	6.0	309.0
	All	**11.1**	**277.3**	**13.4**	**365.1**	**10.2**	**537.9**	**6.7**	**354.0**
2015	Planned	1.2	130.1	0.5	135.6	0.1	4.4	1.0	170.0
	Unplanned	6.0	94.0	6.8	241.4	4.0	49.9	2.0	45.0
	All	**7.1**	**224.1**	**7.3**	**377.0**	**4.1**	**54.3**	**3.0**	**215.0**
2016	**Planned**	1.9	232.2	0.8	219.1	1.0	66.8	0.5	118.0
	Unplanned	4.7	129.5	12.1	495.8	4.2	28.4	-	-
	All	**6.6**	**361.7**	**12.8**	**714.9**	**5.2**	**95.2**	**0.5**	**118.0**
2017	Planned	3.4	414.1	0.5	218.1	4.8	1,870.6	2.0	180.0
	Unplanned	4.8	391.8	13.3	466.4	10.3	275.8	16.0	316.0
	All	**8.2**	**805.9**	**13.8**	**684.5**	**15.1**	**2,146.4**	**18.0**	**496.0**
2018	Planned	1.1	296.3	1.5	731.6	1.2	90.7	-	-
	Unplanned	3.6	150.3	30.7	637.5	1.0	20.0	173.1	5.8
	All	**4.7**	**446.6**	**32.2**	**1,369.1**	**2.2**	**110.7**	**173.1**	**5.8**

Source: UNELCO and VUI Annual Technical Reports

11.3 Customer complaint by concession

Table 3: Customer complaints received by the Utility

Years	2013	2014	2015	2016	2017	2018
Port Vila	104	214	183	190	215	111
Tanna	0	0	5	5	5	0
Malekula	3	0	0	0	1	1
Luganville	0	0	0	1	0	1

Source: UNELCO and VUI Regulatory Reports

The data in table 3 above is annually updated by the utility and provided to the URA. It represents customer complaints directly received by the utility from its customers.

Customer complaints are more pronounced in the Port Vila concession area reflecting its large customer base and to some extent, customers' knowledge regarding electricity usage and services as compared to the other concession areas. The Authority issued a Commission Order[5] in strengthening Customer Complaint and Dispute Resolution process which provide an out of court alternative complaint and dispute resolution. Furthermore in the beginning of 2018, the Authority inaugurated its Luganville North Branch Office as an avenue now available to Luganville customers to lodge their complaints in relation to regulated services issues they may encounter.

Table 4: Customer complaints received by the Authority

Years	2018
Port Vila	6
Tanna	0
Malekula	1
Luganville	8

Table 4 provides the number of customer complaints received by the Authority. While electricity customers approach the Authority for assistance, queries needing response and complaints, the data provided in table 4 above is narrowed down to represent complaints that come about as a result of oversight by the utility.

While the Authority lacks representation on ground in Tanna and Malekula, customers usually have the opportunity to formally lodge their complaints during when the Authority's technical team are inspecting the utility network.

[5] http://ura.gov.vu/index.php/services/commission-publications

Utilities Regulatory Authority of Vanuatu
Investment Building, NPF Compound
PMB 9093
Port Vila, Vanuatu

12 Closing remarks

We hope that the information presented in the EFS is of value to those interested readers keen in knowing about and understanding changes in electricity services in Vanuatu within the four (4) concession areas. We welcome any suggestions from readers to enhance this EFS improving presentation of the data to further provide better understanding to benefit the users/readers of this EFS.

Thank you!

About the Utilities Regulatory Authority ('Authority')

The Authority is the independent economic regulator for water and electricity services in Vanuatu, established by the URA Act no. 11 of 2007 with amendments.

As part of its functions, the Commission is monitoring the provision of electricity and water by utility companies and public services, promoting access and the long term interest of the customers and communicating to consumers' matters relating to the utilities.

Please call us if you have any question on (678) 23335 or visit our office at the Office of the Utilities Regulatory Authority, VNPF Compound, Corner Pierre Lamy & Andre Ballande Street, Port Vila, Vanuatu.

Website: http://www.ura.gov.vu

Utilities Regulatory Authority of Vanuatu
Investment Building, NPF Compound
PMB 9093
Port Vila, Vanuatu

13 Appendixes

13.1 Generation Capacity by Concession Area

Port Vila	Unit	2013	2014	2015	2016	2017	2018
Thermal Capacity	MW	23.37	21.83	21.83	21.83	21.83	19.04
Wind Capacity	MW	3.03	3.58	3.58	3.58	3.30	3.40
Solar Capacity	MW	0.09	0.09	0.08	0.59	0.59	1.69
IPP Solar Capacity	MW	-	-	-	0.77	0.77	0.77
Total	**MW**	**26.48**	**25.49**	**25.49**	**26.76**	**26.49**	**24.89**
Tanna	**Unit**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Thermal Capacity	MW	0.42	0.39	0.39	0.39	0.49*	0.69
Wind Capacity	MW	-	-	-	-	-	-
Solar Capacity	MW	0.02	0.02	0.03	0.03	0.03	0.03
Total	**MW**	**0.44**	**0.41**	**0.43**	**0.43**	**0.53**	**0.72**
Malekula	**Unit**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Thermal Capacity	MW	0.43	0.39	0.39	0.61	0.67	0.69
Wind Capacity	MW	-	-	-	-	-	-
Solar Capacity	MW	0.02	0.02	0.02	0.02	0.02	0.02
Total	**MW**	**0.45**	**0.41**	**0.41**	**0.63**	**0.69**	**0.71**
Luganville	**Unit**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Thermal Capacity	kW	2.85	2.85	2.85	2.89	2.93	3.08
Hydro Capacity	kW	1.20	1.20	1.20	1.20	1.20	1.20
Solar Capacity	kW	-	0.04	0.04	0.04	0.04	0.04
Total	**kW**	**4.05**	**4.09**	**4.09**	**4.13**	**4.17**	**4.32**

Port Olry Installed Capacity is added with Luganville data commencing 2016
** Updated accordingly per UNELCO technical reports*

13.2 Peak Demand by Concession Area

Peak Demand	Unit	2013	2014	2015	2016	2017	2018
Port Vila	MW	11.16	11.42	11.73	11.85	11.85	12.60
Luganville	MW	1.64	1.61	1.85	1.93	1.84	2.06
Malekula	MW	0.13	0.17	0.19	0.22	0.25	0.26
Tanna	MW	0.17	0.16	0.18	0.20	0.21	0.22
Peak Demand in Vanuatu	**MW**	**13.10**	**13.36**	**13.95**	**14.21**	**14.15**	**15.14**

13.3 Gross Energy Generation by Concession Area

	Unit	2013	2014	2015	2016	2017	2018
Port Vila	**GWh**	59.53	59.67	55.41	62.61	64.91	64.90
Luganville	**GWh**	9.06	8.99	9.49	10.17	10.48	11.21
Tanna	**GWh**	0.72	0.79	0.70	0.91	1.03	1.19
Malekula	**GWh**	0.73	0.73	0.72	0.74	0.82	0.93
Total	**GWh**	**70.03**	**70.19**	**66.31**	**74.44**	**77.24**	**78.23**

Utilities Regulatory Authority of Vanuatu
Investment Building, NPF Compound
PMB 9093
Port Vila, Vanuatu

13.4 Generation Mix by Concession Area

Port Vila	Unit	2013	2014	2015	2016	2017	2018
Diesel Power	GWh	43.47	49.73	43.61	52.83	58.23	56.80
Copra Oil Power	GWh	10.40	3.04	3.42	2.37	-	0.79
Wind Power	GWh	5.55	6.79	8.27	5.42	4.77	4.37
Solar Power	GWh	0.11	0.11	0.11	0.87	0.85	1.90
IPP Solar Power	GWh	-	-	-	1.13	1.06	1.03
Total	**GWh**	**59.53**	**59.67**	**55.41**	**62.61**	**64.91**	**64.90**
Malekula	**Unit**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Diesel Power	GWh	0.43	0.52	0.43	0.67	0.79	0.90
Copra Oil Power	GWh	0.26	0.18	0.26	0.04	-	-
Solar Power	GWh	0.03	0.03	0.03	0.03	0.03	0.03
Total	**GWh**	**0.73**	**0.73**	**0.72**	**0.74**	**0.82**	**0.93**
Tanna	**Unit**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Diesel Power	GWh	0.69	0.76	0.66	0.87	0.99	1.16
Solar Power	GWh	0.03	0.03	0.04	0.04	0.04	0.03
Total	**GWh**	**0.72**	**0.79**	**0.70**	**0.91**	**1.03**	**1.19**
Luganville	**Unit**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Diesel Power	GWh	1.83	1.57	2.37	5.01	3.30	3.55
Hydro Power	GWh	7.21	7.38	7.07	5.05	7.13	7.61
Solar Power	GWh	0.02	0.04	0.06	0.06	0.05	0.05
Total	**GWh**	**9.06**	**8.99**	**9.49**	**10.12**	**10.48**	**11.21**

Luganville data is inclusive of Port Olry commencing 2016

13.5 Total Litres of Diesel Utilized in Generation by Concession Area

	Unit	2013	2014	2015	2016	2017	2018
Port Vila	L	10,880,350	12,585,632	11,010,356	13,298,663	14,841,676	14,632,400
Malekula	L	201,482	232,842	200,600	264,450	290,740	327,725
Tanna	L	165,229	186,878	159,800	234,905	232,591	256,420
UNELCO	L	11,247,061	13,005,352	11,370,756	13,798,018	15,365,007	15,216,545
VUI	L	527,007	464,235	688,857	1,426,685	976,259	1,047,748
Total Litres	L	11,774,068	13,469,587	12,059,613	15,224,703	16,341,266	16,264,293

Luganville data is inclusive of Port Olry commencing 2016

13.6 Total Litres of Copra Oil Utilized in Generation by Concession Area

	Unit	2013	2014	2015	2016	2017	2018
Port Vila	L	2,992,328	883,380	968,036	726,111	-	217,968
Malekula	L	85,728	79,840	109,847	16,992	-	-
Total Litres	L	3,078,056	963,220	1,077,883	743,103	-	217,968

Utilities Regulatory Authority of Vanuatu
Investment Building, NPF Compound
PMB 9093
Port Vila, Vanuatu

13.7 Customer number by User Classification by Concession Area

Table 1 (page 5) of the EFS should be referred to which details the various customer groups classified into major customer category utilized in reporting below.

Port Vila	Unit	2013	2014	2015	2016	2017	2018
Non-Commercial	No.	9,836	10,619	11,250	12,030	12,736	13,264
Commercial	No.	1,102	1,192	1,167	1,211	1,215	1,211
Industrial*	No.	71	73	72	76	77	77
Others**	No.	181	180	176	173	187	177
Total	**No.**	**11,190**	**12,064**	**12,665**	**13,490**	**14,215**	**14,729**
Malekula	**Unit**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Non-Commercial	No.	525	539	557	585	940	1,063
Commercial	No.	27	26	23	24	25	26
Industrial	No.	-	-	-	-	-	-
Others**	No.	10	9	16	16	14	8
Total	**No.**	**562**	**574**	**596**	**625**	**979**	**1,097**
Tanna	**Unit**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Non-Commercial	No.	847	934	1,161	1,235	1,352	1,416
Commercial	No.	23	23	21	21	24	23
Industrial	No.	-	-	-	-	-	-
Others**	No.	9	9	9	9	9	9
Total	**No.**	**879**	**962**	**1,191**	**1,265**	**1,385**	**1,448**
Luganville	**Unit**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Non-Commercial	No.	2,028	2,061	2,340	2,604	2,946	3,198
Commercial	No.	324	337	364	372	382	400
Industrial	No.	15	16	18	20	19	21
Others**	No.	67	75	78	88	89	99
Total	**No.**	**2,434**	**2,489**	**2,800**	**3,084**	**3,436**	**3,718**

* *'Industrial' user number in Port Vila is inclusive of electricity connections utilized for water pump stations*

** *'Others' for all concession areas captures utilities' employee numbers*

13.8 Customer Energy Consumption by Major User Classification by Concession Area

Table 1 (page 5) of the EFS should be referred to which details the various customer groups classified into major customer category utilized in reporting below.

Port Vila	Unit	2013	2014	2015	2016	2017	2018
Non-Commercial	GWh	18.10	17.33	16.95	19.79	20.54	21.01
Commercial	GWh	13.43	13.33	12.87	14.38	14.61	14.20
Industrial**	GWh	23.87	23.83	21.20	23.38	25.18	24.58
Other*	GWh	0.73	0.78	0.76	0.77	0.80	0.75
Total	**GWh**	**56.13**	**55.27**	**51.78**	**58.32**	**61.13**	**60.54**
Losses	GWh	3.40	4.40	3.63	4.29	3.78	4.36
Malekula	**Unit**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Non-Commercial	GWh	0.38	0.43	0.42	0.44	0.46	0.45
Commercial	GWh	0.24	0.21	0.19	0.19	0.22	0.24
Industrial	GWh	-	-	-	-	-	-
Other*	GWh	0.02	0.01	0.02	0.02	0.02	0.02
Total	**GWh**	**0.64**	**0.65**	**0.63**	**0.65**	**0.70**	**0.70**
Losses	GWh	0.09	0.08	0.09	0.09	0.12	0.23

Utilities Regulatory Authority of Vanuatu
Investment Building, NPF Compound
PMB 9093
Port Vila, Vanuatu

Tanna	Unit	2013	2014	2015	2016	2017	2018
Non-Commercial	GWh	0.40	0.43	0.39	0.53	0.59	0.67
Commercial	GWh	0.23	0.25	0.21	0.25	0.28	0.32
Industrial	GWh	-	-	-	-	-	-
Other*	GWh	0.02	0.02	0.02	0.02	0.02	0.02
Total	**GWh**	**0.65**	**0.70**	**0.61**	**0.80**	**0.90**	**1.01**
Losses	GWh	0.07	0.09	0.08	0.11	0.13	0.18

Luganville	Unit	2013	2014	2015	2016	2017	2018
Non-Commercial	GWh	2.14	2.25	2.25	2.64	2.95	3.02
Commercial	GWh	3.13	3.08	3.37	3.56	3.45	3.49
Industrial	GWh	2.47	2.36	2.46	2.77	2.59	2.69
Other*	GWh	0.20	0.24	0.25	0.31	0.32	0.55
Total	**GWh**	**7.93**	**7.93**	**8.32**	**9.29**	**9.31**	**9.75**
Losses	GWh	1.12	1.07	1.18	0.83	1.17	1.46

* *'Industrial' user number in Port Vila is inclusive of electricity connections utilized for water pump stations*

** *'Others' for all concession areas captures utilities' employee numbers*